

What Is Claimed Is:

1. An aqueous RNA isolation reagent, comprising two or more components selected from the group consisting of

- (a) at least one nonionic detergent at a concentration of 0.1-1.0% (vol/vol);
- (b) at least one chelator at a concentration of 0.02-0.25 M; and
- (c) at least one phenol at a concentration of 10%-60% (wgt/vol); and
- (d) at least one phenol solubilizer at a concentration of 15%-55% (vol/vol).

3. ^{extraction} An RNA ~~isolation~~ reagent according to claim 1, wherein said at least one nonionic detergent is present at a concentration of 0.5-0.8% (vol/vol). ^{2 for 22}

4. ^{extraction} An RNA ~~isolation~~ reagent according to claim 3, wherein said nonionic detergent comprises at least one detergent selected from the group consisting of an octylphenoxypoly(oxyethylene)ethanol, an N,N-bis(3-D-gluconamidopropyl)cholamide (BIGCHAP), an decanoyl-N-methylglucamide, an n-decyl α -D-glucopyranoside, an n-decyl β -D-glucopyranoside, an n-decyl β -D-maltopyranoside, a deoxy-BIGCHAP, a digitonin, an n-dodecyl β -D-glucopyranoside, an n-dodecyl α -D-maltoside, an n-dodecyl β -D-maltoside, a heptanoyl-N-methylglucamide, an n-heptyl β -D-glucopyranoside, an N-heptyl β -D-thiogluconopyranoside, an n-hexyl β -D-glucopyranoside, a 1-monooleoyl-rac-glycerol, a nonanoyl-N-methylglucamide, an n-nonyl α -D-glucopyranoside, an n-nonyl β -D-glucopyranoside, an octanoyl-N-methylglucamide, an n-octyl α -D-glucopyranoside, an n-octyl β -D-glucopyranoside, an octyl β -D-thiogalactopyranoside, an octyl β -D-thiogluconopyranoside, a polyoxyethylene ester, a polyoxyethylene ether, a polyoxyethylenesorbitan ester, ~~Tween 20~~ ^{TWEEN 20}, a sorbitan ester, an n-tetradecyl β -D-maltoside, a triton, a tyloxaapol and an n-undecyl β -D-glucopyranoside.

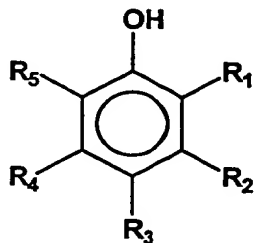
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5. An RNA extraction reagent according to claim 3, wherein said non-ionic detergent is a ⁴octylphenoxypoly(oxyethylene)ethanol

6. An RNA extraction reagent according to claim 4, wherein said ⁵octylphenoxypoly(oxyethylene)ethanol is present at a concentration of about 0.5% (vol/vol).

7. An RNA extraction reagent according to claim 1, wherein said chelator is selected from the group consisting of sodium citrate, EDTA, EGTA, sodium citrate, a citric acid, a salicylic acid or a salt thereof, a tergitol, a phthalic acid, a 2,4 pentanedione, a histidine, a histidinol dihydrochloride, an 8-hydroxyquinoline, an 8-hydroxyquinoline citrate and an o-hydroxyquinone.

8. An RNA extraction reagent according to claim 1, wherein said phenol is a compound according to formula I:



and
where R₁, R₂, R₃, R₄, R₅ are each independently selected from H, alkyl, o-alkyl, halo, acyl and hydroxyl.

9. An RNA extraction reagent according to claim 1, further comprising at least one phenol solubilizer at a concentration of 15%-55% (wgt/vol).

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9. An RNA extraction reagent according to claim 8, wherein said phenol solubilizer is selected from the group consisting of a monoalcohol, a diol and a polyol.

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10. An RNA extraction reagent according to claim 1, further comprising at least one phenol stabilizer at a concentration of 0.05%-0.2% (wgt/vol).

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11. An RNA extraction reagent according to claim 10, wherein said phenol stabilizer is at least one selected from the group consisting of hydroxyquinoline, 8-hydroxyquinoline, 8-hydroxyquinoline citrate, 2,5,7,8-tetramethyl-2-(4',8',12'-trimethyltridecyl)-6-chromanol, *p*-hydroxyquinone, *o*-hydroxyquinone, citric acid or salt thereof, salicylic acid, ascorbic acid, *p*-phenylenediamine and *n*-propylgallate.

12. A kit for isolation of RNA, comprising at least one container, wherein a first container contains at least one RNA extraction reagent according to claim 1.

13. A method for providing cytoplasmic RNA from a sample comprising eukaryotic cells, said method comprising

- (a) mixing said sample containing said cells with an RNA extraction reagent according to claim 1 to form a mixture;
- (b) adding a haloalkane to the mixture and mixing the resulting organic and aqueous phases;
- (c) separating the organic and aqueous phases; and
- (d) precipitating cytoplasmic RNA from the aqueous phase obtained in step (c).

14. A method according to claim 13, further comprising
(e) recovering the cytoplasmic RNA from the precipitate obtained in step (d).

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15. A method according to claim 14, further comprising
(f) isolating mRNA from said cytoplasmic RNA.

16. A method according to claim 14, wherein said sample is derived from a plant or a plant material.

17. A method according to claim 13, wherein said cells are plant cells.

18. A method according to claim 13, wherein said cells are animal cells.

19. A method according to claim ¹⁸~~17~~, wherein said animal cells are mammalian cells.

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20. A method according to claim 13, wherein said cells are insect cells.

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